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# A New Combination in *Mackaya* (Acanthaceae), with Lectotypification for *Mackaya tappingensis*

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ABSTRACT. Comparative survey of morphological characters shows that *Eranthemum tappingense* W. W. Smith is better treated in *Mackaya* Harvey. Consequently, a new combination, *M. tappingensis* (W. W. Smith) Y. F. Deng & C. Y. Wu, is proposed, and its lectotype is designated. The species is distributed in China and Burma (Myanmar).

*Key words:* Acanthaceae, *Eranthemum*, *Mackaya*, *Pseuderanthemum*.

While revising the family Acanthaceae for the forthcoming volume 19 of *Flora of China*, the position of *Pseuderanthemum tappingense* (W. W. Smith) C. Y. Wu & H. S. Lo (Anonymous, 1975) was drawn to our attention because it differs from other members of *Pseuderanthemum* Radlkofer in its secund flowers in terminal racemes and its campanulate corolla without a long slender cylindrical tube. The species was originally described as *Eranthemum tappingense* W. W. Smith (Smith, 1918) from three collections from Burma (Myanmar), i.e., *Forrest* 9655, 9484, and 12149. In the original description, Smith (1918) indicated that this taxon was related to *E. indicum* (Nees) C. B. Clarke and *E. lateriflorum* C. B. Clarke. *Eranthemum indicum*, originally described in *Thyrsacanthus* Nees as *T. indicus* Nees, was transferred to *Mackaya* Harvey by Ensermu et al. (1992), and *E. lateriflorum* to *Gymnostachyum* Nees by Hansen (1985a). It is reasonable, then, to re-evaluate the position of *E. tappingense*.

Wu (1984) included *Eranthemum tappingense* in his *Index Florae Yunnanensis*, cited the three *Forrest* collections listed above, and believed these collections to be from Longchuan xian of Yunnan Province, China. Simultaneously, he mentioned that the species

might belong in *Odontonemella* Lindau, but did not actually transfer the species from *Eranthemum* L. to *Odontonemella*. Hu (2002) included this species under *Pseuderanthemum* in her treatment of the family Acanthaceae for *Flora Reipublicae Popularis Sinicae* and indicated that it is distributed in the boundary areas between China and Burma (Myanmar).

*Odontonemella* was established by Lindau (1893), characterized by a ventricose corolla, two fertile stamens, two staminodes, and spangenpollen, and was typified by *O. indica* Lindau. *Odontonemella indica* was originally described in *Eranthemum* as *E. indicum* (Clarke, 1885) and was transferred to *Mackaya* by Ensermu et al. (1992). Lindau (1895) added a new member to the genus, *O. leptostachya* Lindau based on *Leptostachya wallichii* Nees, which is the lectotype of *Leptostachya* Nees (Hansen, 1985b; Deng & Xia, 2005) and does not fit the original description of *Odontonemella* given by Lindau (1895). Recent studies placed *Odontonemella* in synonymy with *Mackaya* (Brummitt, 1992; Ensermu et al., 1992; Mabberley, 1997; Scotland & Volessen, 2000).

In October 2004, the first author had the opportunity to check the material identified as *Pseuderanthemum tappingense* when he visited the herbaria of Kew and Edinburgh. In the Edinburgh herbarium, the first author saw all three collections cited by Smith, of which *G. Forrest* 9655 was dissected by Smith. This collection clearly shows that the species has two fertile stamens and two staminodes. It is not *Pseuderanthemum* because of its campanulate corolla without a long cylindrical tube. It also differs from *Eranthemum* in the corolla shape, which is long and cylindrical in *Eranthemum* and campanulate in *Mackaya*, and in the pollen grains (Lindau, 1895; Hu,

2002). After comparison with related genera, we concluded that the species belongs in *Mackaya* rather than in *Pseuderanthemum* or *Eranthemum*. Our recent molecular data (unpublished) also indicate that *Mackaya* forms a sister group with *Asystasia* Blume and forms paraphyletic groups with *Pseuderanthemum*. A new combination, *M. tapingensis* (W. W. Smith) Y. F. Deng & C. Y. Wu, is therefore necessary.

The genus *Mackaya* (Harvey, 1859) is characterized by its secund flowers, campanulate corolla, two fertile stamens, and two staminodes. Kanjilal and Das (1939) incorrectly included *Asystasia* in *Mackaya* and transferred three Assam species of *Asystasia* to *Mackaya*, i.e., *M. atroviridis* (T. Anderson) Das, *M. macrocarpa* (Nees) Das, and *M. neesiana* (Wallich) Das. These three species are quite different from *Mackaya* in having four stamens and we prefer to place them in *Asystasia* rather than *Mackaya*. In recent studies, however, *Mackaya* has been treated separately from *Asystasia* (Ensermu et al., 1992; Mabberley, 1997; Scotland & Vollesen, 2000; Wood, 2001). It was placed in subtribe Asystasiaceae (Benth, 1876; Clarke, 1885; Lindau, 1895), tribe Odontonemeae (Lindau, 1895), or subtribe Justiciinae (Scotland & Vollesen, 2000) together with *Dicentranthera* T. Anderson, *Asystasiella* Lindau, *Glossochilus* Nees, and *Salpinctium* T. J. Edwards.

*Mackaya* is a small genus of three species with a disjunct range: *M. bella* Harvey is restricted to South Africa (Phillips, 1951), but *M. indica* (Nees) Ensermu occurs in India, Bhutan, Nepal, and Burma (Myanmar). *Mackaya tapingensis*, proposed herein, is found in southwestern Yunnan, China, and adjacent Burma (Myanmar).

Pollen morphology is one of the important characters defining the generic boundary in the family Acanthaceae (Lindau, 1893, 1895; Bremekamp, 1944). Pollen of *Mackaya tapingensis* is oblate-spheroidal, 3-colporate, and ellipsoidal with a perforate exine (polar axis [P] = 50.2 [46–53]  $\mu\text{m}$ ; equatorial diameter [E] = 44.9 [42–48]  $\mu\text{m}$ ) (Fig. 1). It is quite different from pollen of *Eranthemum* species but is similar to that of *Pseuderanthemum* species and other *Mackaya* species (Raj, 1961; Daniel, 1993, 1998; Scotland & Vollesen, 2000; Hu et al., 2005a, b). It differs from pollen of the other two species of *Mackaya* only in size (Ensermu et al., 1992).

***Mackaya tapingensis*** (W. W. Smith) Y. F. Deng & C. Y. Wu, comb. nov. Basionym: *Eranthemum tapingense* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 177. 1918. *Pseuderanthemum tapingense* (W. W. Smith) C. Y. Hu & H. S. Lo,



Figure 1. Pollen grain of *Mackaya tapingensis* (W. W. Smith) Y. F. Deng & C. Y. Wu from *G. Forrest* 9655 (IBSC).

Fl. Hainan 4: 558. 1975. TYPE: Myanmar [Burma]: “Taping Valley, Upper Burma, lat. 24°20'N, 2000 ft., shrubby plant of 2–4 ft., flowers pale rose, in shady jungle,” Feb. 1913, *G. Forrest* 9655 (lectotype, designated here, E; duplicates, IBSC, K).

*Distribution and habitat.* The species is distributed in southwestern China (Yunnan) and Burma (Myanmar). It grows in shady habitat under forest at elevations of 600–1800 m.

*Relationships.* *Mackaya tapingensis* is similar to *M. indica*, but differs in its lanceolate (vs. elliptic) leaves and glabrous (vs. puberulent or glabrescent) calyx that is basally connate to 1/3–1/2 (vs. less than 1/5) (Smith, 1918; Hu, 2002).

*Additional specimens examined.* BURMA (MYANMAR). **Shan:** Valley of the Taping, *G. Forrest* 9484 (E); Valley of the Taping, 2000 ft., *G. Forrest* 12149 (E). CHINA. **Yunnan:** Gengma Xian, 2250 m, 7 Jan. 2006, *Deng Yunfei* 18452 (IBSC); Lu-se (now Luxi Shi), 1750 m, 3 Mar. 1934, *H. T. Tsai* 56406 (IBSC, KUN); Lu-Hsi Hsien (now Luxi Shi), 1750 m, 9 Feb. 1934, *H. T. Tsai* 56868 (IBSC, KUN, SZ); Yingjiang Xian, 900 m, 26 Oct. 1986, *Lin Qin* 770760 (KUN); Yingjiang Xian, 1800 m, 19 Jan. 1989, *Sun Hang* 1530 (KUN); Yingjiang Xian, 1450 m, Dec. 1981, *Tao Guoda* 12791 (HITBC); Yingjiang Xian, 1500 m, 3 Nov. 1974, *Tao Guoda* 13128 (HITBC, KUN); Yingjiang to Ruili, autumn 1952, *R. C. Ching* 50112 (KUN, SWFC); Zhenkang Xian, 1130 m, 14 Feb. 1959, *Zhu Taiping* 641 (KUN); western Yunnan, autumn 1952, *R. C. Ching* 50633 (KUN, SWFC).

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